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Paul Brooks

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EXAMINER

PO, MING CHEUNG

ART UNIT

PAPER NUMBER

1797

MAIL DATE

DELIVERY MODE

04/29/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/533,192	Applicant(s) BROOKS ET AL.	
	Examiner MING CHEUNG PO	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 January 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-45 and 47-51 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-45, 47-51 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. This is the response to amendment for application 10/533192 filed on 1/02/2009.
2. Claims 1- 45, 47-51 are pending and have been fully considered.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-3, 4, 5-10, 11, 12, 13, 14, 15, 16, 19-25, 27, 28, 43, 45, 46, 48-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over WAUGH (US 4,936,045) in view of WHEELLOCK (US 4,516,980).

5. Regarding claims 1 and 45, WAUGH teaches a process for the preparation of demineralized coal in lines 55 - 68 of column 2 and lines 1 - 13 of column 3, comprising the steps of

(A) forming a slurry of coal particles, preferably at least 50% by weight of which particles having a maximum dimension of at least 0.5mm, with an aqueous solution of an alkali, which solution has an alkali content of from 5 to 30% by weight, such that the slurry has an alkali solution to coal ratio on a weight basis of at least 1:1 A ratio of 1:1 alkali solution to coal is evidence of a coal content of 5% to 30% by weight. **((a) of present claim 1: forming a slurry of coal particles in an alkali solution, said slurry containing 10% - 30% by weight coal:).**

(B) maintaining the slurry at a temperature of from 150 to 300 C, preferably 170 C to 230 C, for a period of from 2 to 20 minutes substantially under autogeneous hydrothermal pressure and rapidly cooling the slurry to a temperature of less than 100 C. **((b) of present claim 1: maintaining the slurry at a temperature of 150 - 250 C under a pressure sufficient to prevent boiling).**

(C) separating the slurry in to alkalized coal and a spent alkali leachant solution **((c) of present claim 1: separating the slurry into an alkalized coal and a spent alkali leachant),**

(E) acidifying the alkalized coal by treatment with an aqueous solution of sulphuric or sulphurous acid to yield a slurry having a pH of from 0.4 to 1.4 and a conductivity of from 10,000 to 100,00 us **((d) of present claim 1: forming an acidified slurry of the alkalized coal, said slurry having a pH of 0.5 – 1.5),**

(F) separating the slurry into acidified coal and a spent acid leachant solution **((e) of present claim 1: separating the acidified slurry into a coal-containing fraction and a substantially liquid fraction)**

(G) washing the acidified coal. WAUGH further elaborates in lines 25 – 38 of column 5 that the acidified coal with be first washed with a fresh acid solution of about pH 1. A specific example is given in lines 7 – 14 of column 6. A coal filter cake after acidification was treated with 0.1M sulphuric acid and maintained at pH of 1 with sufficient water. **((f) of present claim 1: subjecting the coal-containing fraction to a washing step in which the coal-containing fraction is mixed with water and a polar organic solvent or water and an organic acid to form a mixture)**

The mixture is then taught in lines 10 - 11 to be filtered. **((g) of present claim 1: separating the coal from the mixture in step (f))**

WAUGH does not seem to explicitly state the acidified coal in step (G) is washed in a hydrothermal washing step.

However, WHEELock teaches a process for producing low-ash, low-sulfur coal. The process is taught in detail from lines 21 - 68 of column 4 and lines 1 - 12 of column 5. Coal is subjected to an alkali leaching step, an acid leaching step and a washing step under elevated temperature. Run 1 in table A shows that the water washing step was done at the elevated temperature of 100 C.

It would be obvious to one of ordinary skill in the art to perform the washing step (G) in the process WAUGH teaches with the elevated temperature that WHEELock teaches.

The motivation to do so can be found in lines 31 - 42 of column 5 and table A of WHEELock. WHEELock teaches that a high temperature water washing leads to maximized reduction of ash and sulfur. In lines 61 - 68 of column 3 and lines 1 - 13 of column 4, WHEELock explains why a higher temperature step leads to a reduction of ash and sulfur. Analcite and natrodavyne may be formed from kaolinite and clay minerals from alkaline treatment of coal. When treated with sulfuric acid, analcite and natrodavyne may form tamarugite. Tamarugite is difficultly soluble and using higher temperatures have to be used to be effective at extracting tamarugite.

Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

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Regarding claims 2 and 3, WAUGH teaches in lines 53 – 66 of column 5 that the particle size of the coal provided is 200µm (**coal provided to step (a) of present claim 1 is 100% less than 1mm and 100% less than 0.5 mm**).

Regarding claim 4, WAUGH does not seem to explicitly state that the coal provided in step (a) of present claim 1 contains 5% by weight smaller than 20 microns) Regarding claim 4, WAUGH does not appear to explicitly disclose the coal provided in present step (a) contains 5% by weight smaller than 20 microns.

It would be obvious to one of ordinary skill in the art at the time of the invention to use coal that is 5% by weight smaller than 20 microns with a reasonable expectation of success.

Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Regarding claim 5 and 6, WAUGH teaches in lines 40 - 53 of column 7 that the slurry concentration may be 29% (**slurry formed in step (a) of present claim 1 has a coal concentration of from 10% to 30% by weight and about 25% by weight**).

Regarding claims 7 and 8, WAUGH teaches in lines 43 - 46 of column 3 that the alkali concentration should preferably in the range of 5% to 20% (**range of 8% to 20% by weight and from 13% to 15% by weight**).

Regarding claim 9, WAUGH teaches in lines 47 – 57 of column 3 that temperatures of 150 C – 300°C are feasible , temperature of 170 -230 C are usually adequate (**150 – 250°C**).

Regarding claim 10, WAUGH teaches in lines 68 of column 3 and lines 1-3 of

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column 4 that residence times of an hour or more are not excluded and may be appropriate when low alkaline leaching temperatures are chosen **(60 minutes)**.

Regarding claim 11, WAUGH does not appear to explicitly disclose that the slurry from present step (b) is maintained at a rate of less than 2°C per minute in the temperature range of 150 C to 250°C.

However, it would be obvious to one of ordinary skill in the art at the time of the invention to optimize the rate at less than 2°C per minute in the temperature range of 150 C to 250°C with a reasonable expectation of success (see MPEP 2144.05).

Regarding claim 12, WAUGH teaches in lines 64- 68 of column 2 that the slurry is substantially under autogeneous hydrothermal pressure **(autogeneous pressure to prevent the slurry from boiling)**.

Regarding claim 13, WAUGH teaches in lines 27 – 30 of column 6 that the slurry was recovered at 80°C **(80°C)**

Regarding claim 14, WAUGH teaches in lines 27 – 29 of column 6 that the slurry was heated to 200 C and then cooled to 80 C in 1.5 hrs.

WAUGH does not appear to explicitly disclose that the slurry from present step (b) is cooled to a temperature of from 30 – 80°C at a cool rate of less than 20°C/minute and at 2°C per minute whilst the temperature of the slurry is in the range of 240 C – 150 °C.

However, it would be obvious to one of ordinary skill in the art at the time of the invention to optimize the cooling period at a uniform rate of with a reasonable expectation of success (see MPEP 2144.05).

Regarding claim 15, WAUGH teaches in lines 67 - 68 of column 5 that the slurry was washed with water to remove excess alkali **(the alkalized coal recovered is washed to remove excess alkali).**

Regarding claim 16, WAUGH teaches in lines 37 - 48 of column 4 that the alkalized coal and spent leachant should preferably be separated quickly. The spent leachant is mixed with calcium oxide or calcium hydroxide to precipitate the soluble silicate and aluminate ions as their insoluble calcium salts **(treated to remove sodium aluminosilicates therefrom prior to sending to step (d) of present claim 1).**

Regarding claim 19, WAUGH teaches in lines 62 - 64 of column 4, the alkalized coal is acidified with a mineral acid **(mineral acid)**

Regarding claim 20, WAUGH teaches in lines 7 - 10 of column 3 that the alkalized coal is acidified with an aqueous solution of sulphuric or sulphurous acid **(sulphuric acid).**

Regarding claims 21 and 22, WAUGH teaches in lines 7 - 15 of column 5, he alkalized coal is acidified to a pH of about 1 as rapidly as possible. It is desirable to add the alkalized coal to an acidic solution of sufficient concentration to ensure that the reusing mixture is maintained as close as possible to pH 1 **(slurry has a pH that falls in the range of 0.5 to 1.5 and specifically about 1.0).**

Regarding claim 23 and 24, WAUGH does not appear to give the temperature of the slurry in present step (d). However, ambient temperature is from 20 to 23.5°C and WAUGH teaches in lines 64 – 65 of column 5 that the slurry is cooled to room temperature after alkalization and not heated again. Therefore the slurry is inherently

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with in the range from 20 C to 90°C as well as falling within the range of 30 to 60°C.

Regarding claim 25, WAUGH teaches in lines 7 – 13 of column 6 that the coal was treated with 0.1M sulphuric acid and maintained at pH of 1 with sufficient water and then stirred for 45 minutes **(for a period of at least one minute)**

Regarding claims 27 – 28, WAUGH does not appear to explicitly disclose re-slurrying the coal fraction from step (e) is re-slurried with water and acid and brought to a pH of between 0.5 and 1.0 for a further period of greater than 1 minute.

However, it is well known in the art that re-slurrying can be used to get product that is more pure.

Therefore, it would be obvious to one of ordinary skill in the art to reslurry the coal fraction from step (e) with water and acid and brought to a pH of between of 0.5 and 1.0 for a further period of time of greater than 1 minute between one and four times.

Regarding claim 43, WAUGH teaches in lines 37 – 39 of column 5 that the final washing of the acidified coal is carried out with water which may be deionized **(coal recovered from step (g) is washed with water)**.

Regarding claim 46, WAUGH teaches in lines 55 – 69 of column 2 and lines 1 - 13 of column 3 of a process of demineralizing coal, comprising the steps of

a) forming a slurry of coal particles, preferably at least 50% by weight of which particles have a maximum dimension of at least 0.5mm, with an aqueous solution of an alkali, which solution has an alkali content of from 5 to 30% by weight, such that the slurry has an alkali solution to coal ratio on a weight basis of at least 1:1 **(forming a slurry of coal particles in an alkali solution; said slurry containing 10% to 30% by**

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weight coal).

(b) maintaining the slurry at a temperature of from 150 to 300 C, preferably 170 C to 230 C, for a period of from 2 to 20 minutes substantially under autogeneous hydrothermal pressure and rapidly cooling the slurry to a temperature of less than 100 C **(maintaining the slurry at a temperature of 150 - 250 C under a pressure sufficient to prevent boiling).**

(c) separating the slurry in to alkalized coal and a spent alkali leachant solution **(separating the slurry into an alkalized coal and a spent alkali leachant),**

(d) regenerating the alkali leachant solution for reuse in step (a) above by the addition of calcium or magnesium oxide or hydroxide thereto to precipitate minerals therefrom ,

(e) acidifying the alkalized coal by treatment with an aqueous solution of sulphuric or sulphurous acid to yield a slurry having a pH of from 0.4 to 1.4 and a conductivity of from 10,000 to 100,00 us **(forming an acidifier slurry of the alkalized coal, said slurry having a pH of 0.5 – 1.5),**

(f) separating the slurry into acidified coal and a spent acid leachant solution **(separating the acidified slurry into a coal-containing fraction and a substantially liquid fraction), and**

(g) washing the acidified coal.

Regarding claim 48 and 49, WAUGH teaches in lines 43 - 51 of column 4 that the spent leachant is mixed with sufficient calcium oxide or calcium hydroxide to regenerate the alkaline leachant for recycling while simultaneously precipitating the soluble silicate

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and aluminate ions as their insoluble calcium salts **(the spent alkali leachant is treated to regenerate caustic and to recover minerals using calcium oxide or calcium hydroxide).**

Regarding claim 50, the spend leachant is the liquid fraction of step (e) **(liquid fraction of (e) is treated to regenerate a caustic solution and to recover minerals).**

Regarding claim 51, WAUGH teaches in lines 43 - 54 of column 4 that the spent leachant may be mixed with magnesium salts such as the mixed oxides or hydroxides of calcium and magnesium derived from dolomite **(calcium oxide, calcium hydroxide, magnesium oxide, magnesium hydroxide or mixed oxides or hydroxide of calcium and magnesium derived from dolomite).**

6. Claims 26 and 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over WAUGH (US 4,936,045) in view of WHEELLOCK (US 4,516,980) and SCHAPIRO (US 4,618,346).

The above discussion of WAUGH in view of WHEELLOCK, is incorporated herein by reference.

WAUGH does not seem to explicitly teach that the coal is maintained in contact with the acid solution in step (d) for at least a period of about 60 minutes.

However, SCHAPIRO teaches in lines 37 - 45 of column 4 that it is possible to leach minerals for a period up to 24 hours.

It would be obvious to one of ordinary skill in the art to optimize the period of time that the coal is in contact with the solution (see MPEP 2144.05).

Regarding claims 29 – 30, WAUGH does not seem to explicitly disclose mixing the coal-containing fraction with a solution of water and an alcohol selected from ethanol, methanol, propanol or mixtures thereof.

However, SCHAPIRO teaches in lines 50 – 60 of column 3 that an alcohol solution containing between one and four carbons is added to the coal to swell coal.

The motivation to do so can be found in the same lines. The alcohol is taught to enhance mineral removal by swelling the pores and wetting the surface of the coal.

Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

7. Claim 17, 18, 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over WAUGH (US 4,936,045) in view of WHEELLOCK (US 4,516,980) and SCHAPIRO (US 4,618,346) and further in view of SMIT (US 4,582,512).

The above discussion of modified WAUGH is incorporated herein by reference.

WAUGH does not seem to explicitly disclose mixing the coal from step (d) with water or an acid solution to obtain a slurry having a coal concentration that falls within the range of 5% to 20% by weight and about 10% by weight.

WAUGH also does not seem to explicitly disclose the coal mixed with water and a polar organic solvent such that a slurry having solids content of 10% to 30% by weight is formed.

However, SMIT teaches in lines 16 – 17 of column 3 of a coal slurry with solids concentration of about 10% to about 30% by weight. The slurries are taught in lines 67 -68 of column 2 and lines 1 – 4 of column 3 to be leached with acid solution.

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It would be obvious to one of ordinary skill in the art to make the slurry that WAUGH teaches with the concentration of about 10% to about 30% by weight that SMIT teaches.

The motivation to do so can be found in lines 15 – 19 of column 3 of SMIT. SMIT teaches that the solids concentration is important. If too high, the agitation is difficult and too low, leaching is inefficient. About 10% to about 30 % is satisfactory.

Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Regarding claim 32, the slurry of modified WUAHG is originally with a pH of about 1 (**pH of from 1.5 to 2.5**)

8. Claims 33 – 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over WAUGH (US 4,936,045) in view of WHEELLOCK (US 4,516,980) and SCHAPIRO (US 4,618,346) and SMIT (US 4,582,512) and further in view of MASSEY (US 4,364,740).

The above discussion of modified WAUGH is incorporated herein by reference.

Regarding claim 33, WAUGH does not seem to explicitly disclose that the slurry is heated to a temperature of from 240C to 280C in step (f).

However, MASSEY teaches in lines 15 - 30 of column 5, of the use of lower weight alcohols interacting with the coal at a temperature and pressure above the critical temperature and critical pressure of the alcohol for sufficient length of time to allow the supercritical fluid to saturate the pores of the coal.

It would have been obvious to one of ordinary skill in the art to heat the alcohol – coal slurries that modified WAUGH teaches to a critical temperature under a critical

pressure that MASSEY teaches.

The motivation to do so can be found in lines 3 – 28 of column 6 that the product resulting from MASSEY's method yields enriched hydrocarbonaceous fraction such as coal with a mineral content that is substantially reduced from the original coal.

Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Regarding claim 34, MASSEY teaches in lines 29 – 30 of column 5 that the time is between about 5 seconds and 5 minutes.

Regarding claim 35, modified WAUGH does not appear to explicitly disclose the heating rate of the slurry.

However, it would be obvious to one of ordinary skill in the art to optimize the rate of heating (see MPEP 2144.05)

9. Claims 29 – 31, 44, and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over WAUGH (US 4,936,045) in view of WHEELLOCK (US 4,516,980) and KINDIG (US 4,743,271).

The above discussion of WAUGH is incorporated herein by reference.

Regarding claim 29 and 30, WAUGH does not appear to explicitly disclose ethanol as an organic solvent may be used to wash the coal-fraction. WAUGH does states that an organic acid with a sufficiently high dissociation constant such as acetic acid may be used. Acetic acid has a dissociation constant of 4.76. Ethanol has a dissociation constant of 15.9.

KINDIG teaches a process of removing contaminates to produce a higher purity

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coal, comprising physical separation, an acid preleach, a hydrofluoric acid leach, and a hydrochloric acid leach. KINDIG teaches a process for washing the coal product in lines 58 – 60 of column 6, lines 66 – 68 of column 6, and lines 1 – 6 of column 7. KINDIG teaches that alcohol may be added to the water washing.

It would be obvious to one of ordinary skill in the art to substitute the acetic acid that WAUGH teaches with the ethanol that KINDIG teaches.

The motivation to use ethanol as the solvent can be found lines 66 – 68 of column 6, and lines 1 – 6 of column 7 of KINDIG. KINDIG teaches that washing coal with a solution of ethanol and water may provide additional halogen removal. .

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made.

Regarding claim 31, KINDIG teaches in table 9 of column 17 that 20% solids slurry can be made and in test no. 231 of table 11 on column 19 that it may be done with a solution of 5% alcohol including ethanol.

Regarding claim 44, KINDIG does not seem to explicitly disclose that an ash content of 0.01 – 0.2% could be reached.

However, KINDIG teaches in test no 20 in table 6 that the aqueous HCL leaching can result in a ash content of 0.15% after 30 minutes **(demineralised coal recovered from step (g) has an ash content of from 0.01 - 0.2% by weight)**.

It would be obvious to one of ordinary skill in the art to leach the coal-containing fraction that WAUGH teaches with the process that KINDIG teaches involving hydroflouroic acid preleach, a hydrochloric leach, another hydrochloric leach and then

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washed and drained.

The motivation to do so can be found in lines 31 - 35 of column 5 and lines 56 – 58 of column 5 of KINDIG. KINDIG teaches that hydrofluoric leaches are especially effective in treating silicates and aluminosilicates and that hydrochloric leaches are especially effective in treating calcium and remaining aluminum.

Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Regarding claim 47, KINDIG teaches in test no. 221 of table 11 on column 18 that the water washes may be done in ambient temperature.

10. Claim 36 - 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over WAUGH (US 4,936,045) in view of WHEELLOCK (US 4,516,980) and KAMINO (US 4,424,062).

The above discussion of Modified WAUGH is incorporated herein by reference.

Regarding claims 36 and 37, WAUGH does not appear to explicitly state a washing step where the coal-containing fraction is mixed with water and an organic acid selected from citric acid.

However, KAMINO teaches that 2.0 to 10.0% of citric acid in lines 23 – 26 of column 4 maybe be used in a coal deashing process in an aqueous solution as explained in lines 24 - 30 of column 2.

It would be obvious to one of ordinary skill in the art at the time of the invention to use the 2.0 to 10.0 % citric acid solution that KAMINO teaches to wash the coal containing fraction after present step (f).

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The motivation to do so can be found in lines 53- 50 of column 2. KAMINO teaches that the process is a higher efficiency than standard processes and the operation can be carries out with very high safety.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made.

Regarding claims 38 and 39, WAUGH teaches in lines 47 – 57 of column 3 that temperatures of 150 C – 300 C are feasible , temperature of 170 -230 C are usually adequate **(150 – 250 C and 140C and 160C)**.

Regarding claim 40, WAUGH teaches in lines 1 - 13 of a process of demineralizing coal 4,936,045 that comprise the step of maintaining the slurry substantially under autogeneous hydrothermal pressure **(pressure at a level to prevent boiling)**

Regarding claim 41, WAUGH teaches in lines 68 of column 3 and lines 1-3 of column 4 that residence times of an hour or more are not excluded and may be appropriate when low alkaline leaching temperatures are chosen **(60 minutes)**.

Regarding claim 42, WAUGH does not seem to explicitly disclose a heating rate of between 2 C per minute and 20 C per minute.

However, it would be obvious to one of ordinary skill in the art to optimize the heating rate.

Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

Response to Arguments

11. Applicant's arguments with respect to claims 1-45, 47-51 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MING CHEUNG PO whose telephone number is (571)270-5552. The examiner can normally be reached on 9:00 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571)272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Ming Cheung Po
Patent Examiner
AU 1797

/Cephia D. Toomer/

Primary Examiner, Art Unit 1797